SUPCON

SUPCON

Webfield®
TCS-900
Safety Instrumented System

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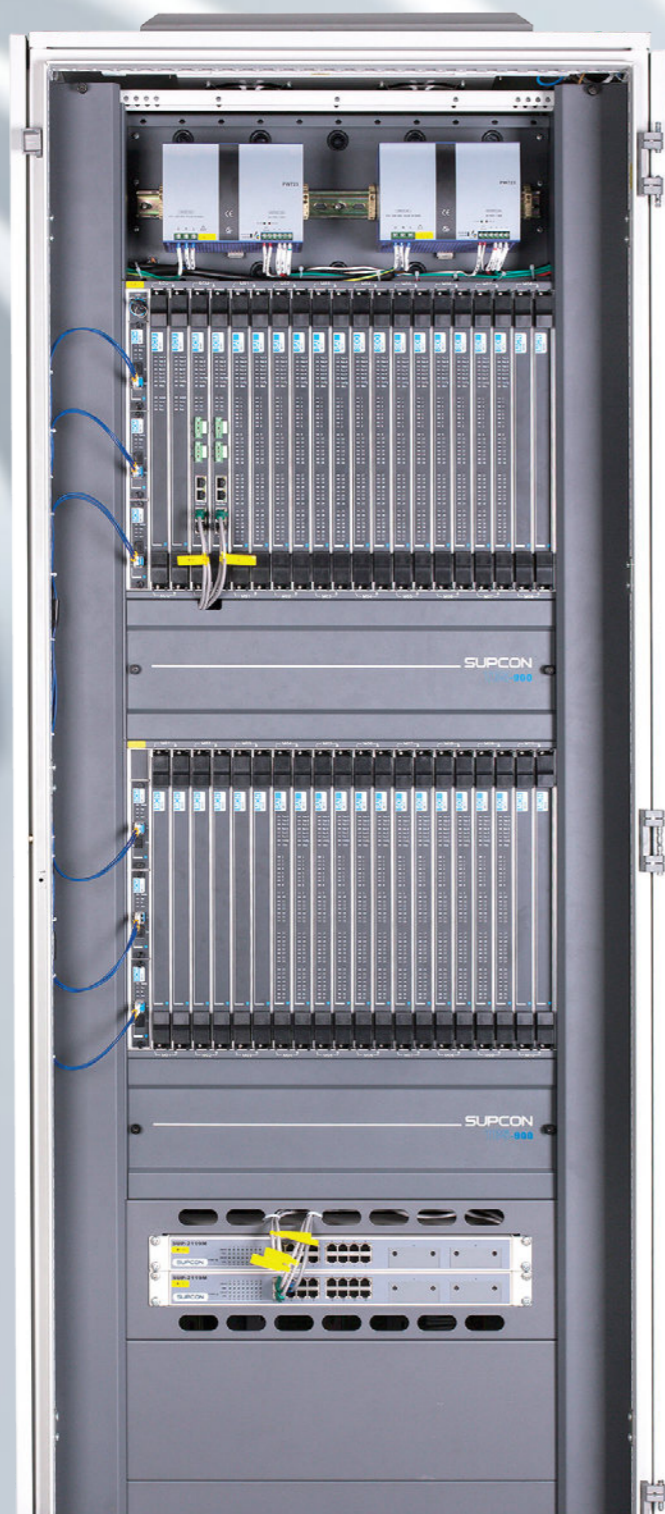Fax: +86 571 8666 7318

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EXCELLENT IN SAFETY AND PROFITABILITY

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FEATURES

Best safeguard for your plant

With Triple Modular Redundant (TMR) architecture, TCS-900 SIS system couples safety with process availability, helps you safeguard your plant operation and maximizes uptime by avoiding spurious shutdowns.

Secure Your Operation

Past solutions for safe operations may no longer be sufficient. New international standards for safety, like IEC 61508 and IEC 61511, are prompting a re-examination of safety practices.

Certificated with TÜV SIL3, TCS-900 safety instrumented system helps you reliably protect your assets and improve your process availability whether standalone or integrated with a control system.

Satisfy Your Safety Requirements

TCS-900 SIS system provides all safety and critical control solutions for process industry, especially in Oil& Gas, Chemical& Petrochemical, Energy, Metallurgy, and Machinery.
TCS-900 SIS system complies with major industry standards for safety applications:

- Emergency Shutdown Systems (ESD)
- Process Shutdown Systems (PSD)
- Interlock Systems
- Critical Control
- Boiler/Burner Management (BMS)
- Fire & Gas Protection/Detection (F&G)
- High Integrity Pressure Protection System (HIPPS)

Simplify Your Maintenance

TCS-900 is an intuitive and intelligent safety platform. It offers tools and features to simplify your maintenance. 1ms resolution Sequence of Event(SOE) record keeps you accurately informed, comprehensive diagnostics helps you locate faults exactly, and HART protocol support helps you calibrate and maintain field instrument easily.

Facilitate Your Engineering

TCS-900 can be combined with all leading distributed control systems (DCS) via communication standard, and be integrated seamless with SUPCON ECS-700 DCS system.

For third party integration, TCS-900 offers features such as:

- Transfer of alarms and events with time stamp
- Transfer of detailed system diagnostic data
  Transfer and visualization of process data and safety-related
- locking states

- Maintenance override switch (MOS)
- Partial stroke test (PST)
  Start-up bypass (SUB)

Maximize Your Profitability

TCS-900 is designed to meet a wide range of safety requirements and maintain the highest integrity level, even in the presence of multiple system failures. By minimizing spurious shutdown, TCS-900 can potentially save your operation cost.

Ensure Your Availability

TCS-900 SIS adopts TMR system structure, its TMR design uses a majority voting process to identify the source of a fault, and barrier the faults by five-level voting mechanism.

Random hardware failures will cause one of the three control "slices" to react differently to the others. This discrepancy will be captured and reported by the voting system. The TMR system will always react immediately to contain system faults, helping to ensure it meet your safety integrity requirements.
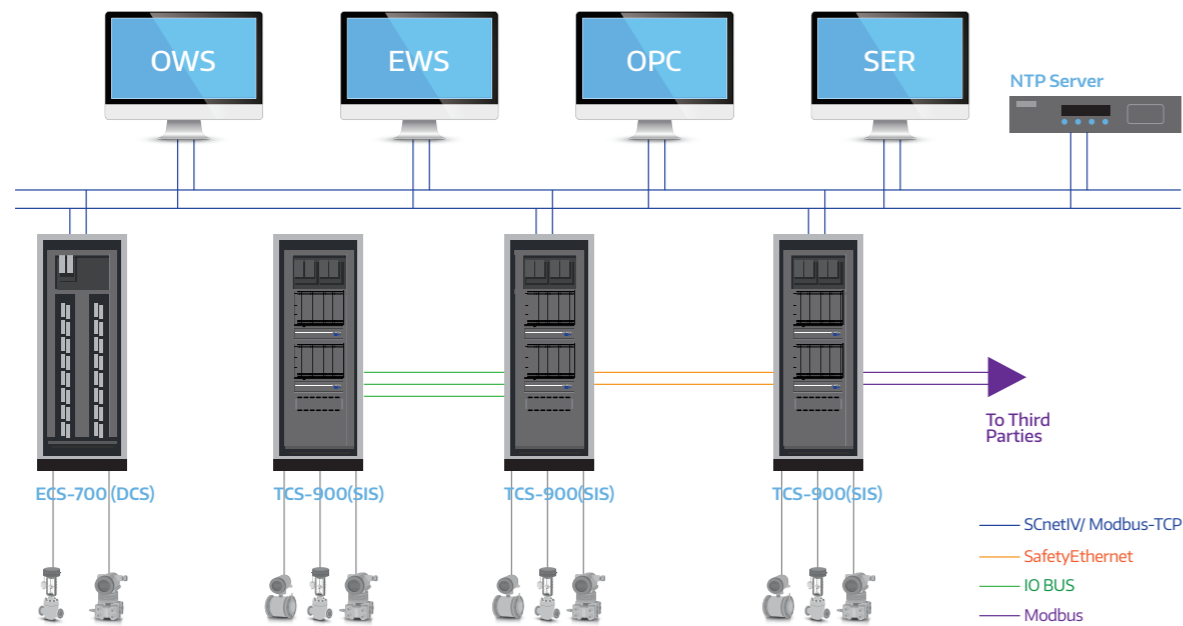
ARCHITECTURE

Flexible Integrated Network

The TCS-900 Safety Instrumented System (SIS) inter-station communication is via SafeEthernet, which guarantees the scalability of the system. For large scale Plant SIS application, the TCS-900 enables you to integrate more than 128 SIS control stations together via SafeEthernet communication.

Typical features can be offered as follows:

- The Main SIS station can publish safety data to 128 SIS control stations
- Each SIS control station can receive safety data from 16 SIS control stations

Voting Algorithm

Minimize STR (Spurious Trip Rate) with 3-3-2-2-0 degradation mode

TCS-900 is designed to maximize plant availability and therefore improve productivity. Key to this promise is TCS-900's TMR architecture. Each module (processor or I/O module) adopts TMR structure, meanwhile two same type of modules can be configured as hot standby redundancy.

With this design, no single point of failure or multiple failures will trigger a shutdown. Thus, spurious trip is avoided and there's no need to stop TCS-900 for any kind of hardware or software expansion or maintenance.
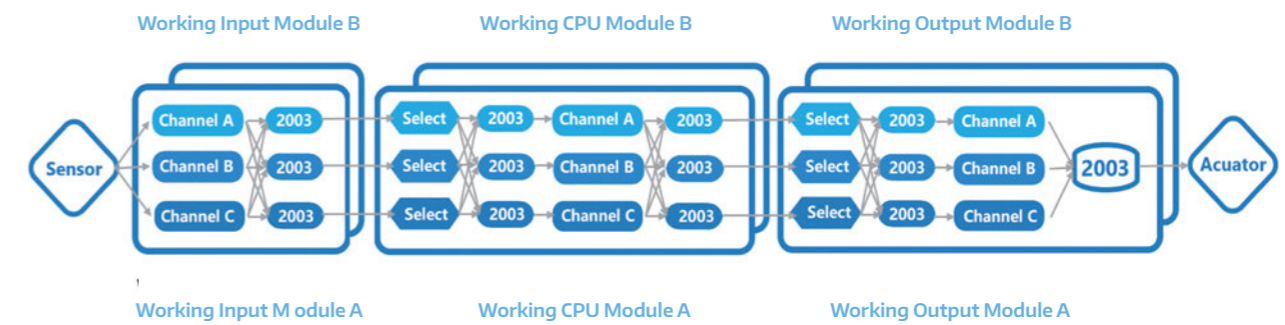
HARDWARE

Rack

Rack is the mechanical structure for installing modules in safety control station, and on its base there is the I/O bus SafeECI for data communication among modules. TCS-900 system has main rack MCN9010 and extended/ remote rack MCN9020. Each SIS control station can only configure one set of MCN9010, and up to 7 sets of MCN9020.

Main rack MCN9010 can house four types of modules: I/O bus extension module, controller, communication module and I/O module. The 3 slots at left are used for inserting I/O bus extension module SCM9010 or bus terminal module SCM9020. Slots marked by "SCU" are only for inserting redundant controllers SCU9010. Slots marked by "SCM" are only for inserting redundant network communication modules SCM9040. Other slots are used to insert I/O modules, which are designed as redundant, and marked by "L" or "R".

Extended rack MCN9020 can house two types of modules: I/O bus extension module and I/O module.
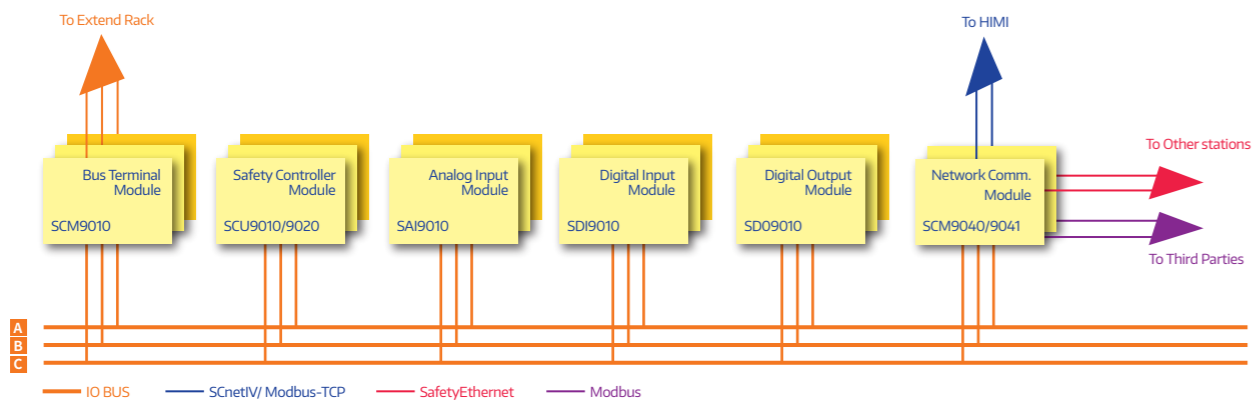
Controller Module SCU9010/SCU9020

Functions

- Scan real-time input data of input module, and process real-time input tag.
- Execute safety core to achieve application logic.
- Process real-time output tag, and send real-time output data to output module.
- Achieve safety communication with other control stations of TCS-900.
- Achieve general inter-station communication with other systems (such as DCS).
- Diagnose the control stations in cycle.
- SCU9020 is compatible for complicated control applications such as CCS/BMS.

Specifications

Item	Specification	
Module Features	**SCU9010**	**SCU9020**
Power Voltage	24V DC(-15%~+20%), dual-channel redundancy	
Redundancy	Support	
Hot Swapping	Support	
Control Cycle	10ms(only SCU9020), 20sm, 50ms, 100ms, 200ms, 500ms, 1s optional	
Capacity of Single Station	Maximum 2496 I/Os	
Measure Index		
Power Consumption	10W	18W
Frequency	180MHz	800MHz
User Programs	256 pages	
Soft SOE Point Resolution	1 control cycle	
Safety Index		
System Capability	SC3	
Safety Integrity Level	SIL3	
PFD and Test Interval	Refer to PFDavg and PFH data	
Vote Mechanism	2oo3D	
Degrade Strategy	3-2-0 (non-redundant), 3-3-2-2-0 (redundant)	
Certificate	Certificated by TUV Rheinland	
Mechanical Index		
Dimension(W×H×D)	26mm x 379mm x 329mm	
Weight	1350g	1650g
Encapsulation	Plastic, incombustible (level V-0)	
Installation	Rack installation	
Environment Index		
Temperature	Work	(−5~60)°C
	Storage and Transportation	(−40~85)°C
Humidity	Work	(5%~95%)RH, no condensation
	Storage and Transportation	(5%~95%)RH, no condensation
Altitude	Work	(0~4000)m
	Storage and Transportation	(0~4000)m

Module List

| Module	Type	Description
SCU9010	Controller	TMR design, support redundancy, 180MHz
SCU9020	Controller	TMR design, support redundancy, 800MHz
MCN9010	Main rack	For installing controller, extended communication module, network communication module and I/O module, etc. For building SIL3 security loop
MCN9020	Extended rack	For installing 10 pairs of I/O modules
MCN9030	Empty slot cover	Provide cover plate for empty slot
SCM9010	Extended communication module	Extend the system bus to extended/ remote rack, each rack supports 3 extended communication
SCM9020	Bus terminal module	TMR design, support redundancy
SCM9040	Network communication module	Installed in main rack, for communication between engineer station and third-party, and inter-station communication, etc.
SCM9041	Network communication module	Installed in main rack, for communication between engineer station and third-party, and inter-station communication, etc. Support Modbus as master station
SCM9011	Star-bus communication module	Support 4 racks
SDI9010	DI module	32-channels, 24V DC, SIL3, TMR
SAI9010	AI module	32-channels, (4~20)mA, SIL3, TMR
SDO9010	DO module	32-channels, 24V DC, SIL3, TMR
SAI9020-H	AI module	16-channels, (4~20)mA, SIL3, HART, TMR
SAO9010-H	AO module	16-channels, (4~20)mA, SIL3, HART, TMR
SPI9010	PI module	Pulse input module, 9-channels PI, 2-channels DO, SIL3, TMR
TDI9010	DI terminal board	Terminal board, 32-channels, 24VDC, SIL3
TDI9012	DI terminal board	Terminal board, 32-channels, 48VDC, SIL3
TAI9012	AI terminal board	Terminal board, 32-channels, (1~5)V DC, SIL3
TAI9020	AI terminal board	Terminal board, 16-channels, 24V DC, SIL3, HART
TAO9010	AO terminal board	Terminal board, 16-channels, 24V DC, SIL3, HART
TDO9010	DO terminal board	Terminal board, 32-channels, 24VDC, SIL3
TPI9010	PI terminal board	Terminal board, 9-channels input, 2-channels output, SIL3
SafeContrix	Configuration software	IO configuration, programming, etc.
SOEServer SOEBrowser	SOE software	SOE management
VFtimeSycn	Time synchronization software	Time synchronization
SafetyManager	System diagnose software	System diagnose
OPC Server	OPC server	OPC DA, OPC A&E
VxSCADA	HMI software	

COMMUNICATION

PROGRAMMING

Seamless Integration with ECS-700 (SUPCON DCS)

The TCS-900 Safety Instrumented System (SIS) is more than just a shutdown system. Seamlessly integrated with SUPCON's ECS-700 Distributed Control System (DCS), it provides the backbone of safe plant operation.

Typical features can be offered as follows

- Seamlessly integrated process control network for both DCS and SIS.
- Unified asset management access for related DCS and SIS via Smart Field Devices.
- DCS EWS and SIS EWS are recommended to be separated.
- Integrated operation of DCS and SIS via shared OWS.

ECS-700 (DCS)   TCS-900 (SIS)
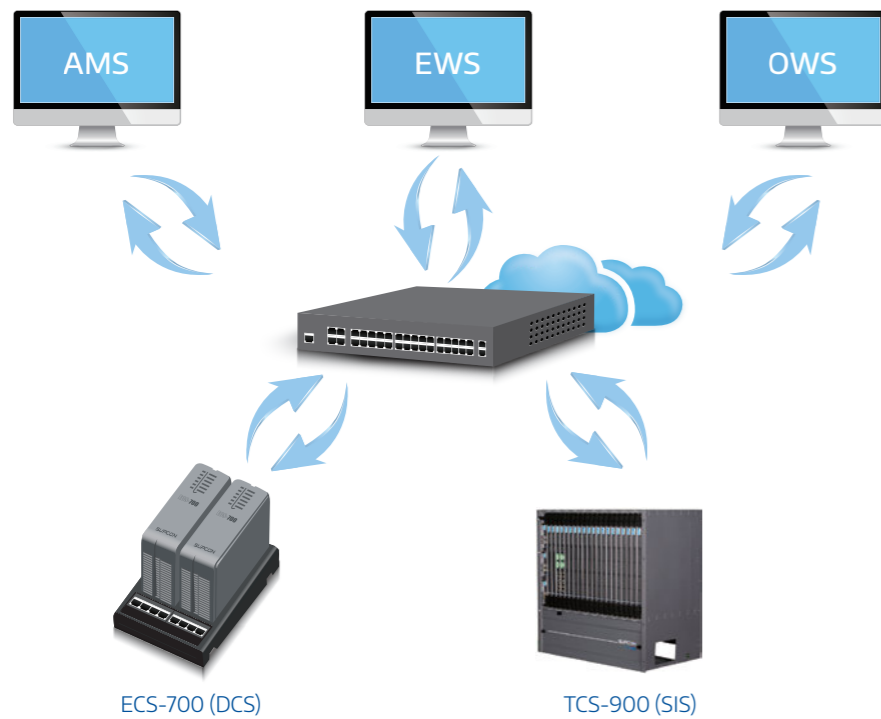
Integration with Third Parties

TCS-900 can also be easily integrated with third-party DCS systems to fulfill operating and monitoring functions. The integration of DCS and SIS is achieved through high capacity cross-manufacturer communication standards.

SafeContrix
The State-of-the-art Safety Application Environment

SafeContrix is a set of efficient and easy-to-use safety application software package covering functions such as configuration, programming and diagnose. All SIS data can be easily touched in PCS HMI and AMS.

Highlights of SafeContrix

- Flexible programming using Function Block Diagrams (FBD), Structured Text (ST), Ladder Diagrams (LD)
- IEC 61131-3 compliant, supporting all functions and variable types of safety-related programming
- Program validation including offline simulation and online debugging
- SOE programming
- Built-in user management for project and system access
- Configuration version control, such as back up difference versions configuration and restoration of any version configuration.
- Compatible with Microsoft Windows 7, Windows 10
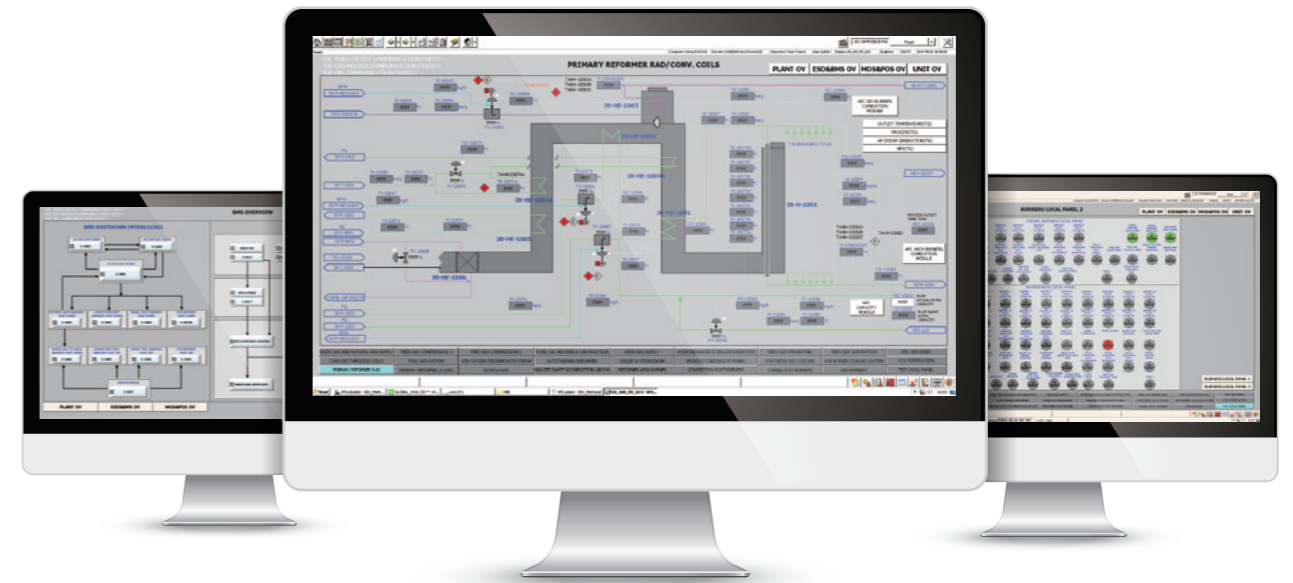
SERVICE

Delivering Just What Your Plant Needs

SUPCON as a service partner offers your plant regular scrutiny by certified technicians. You'll rely on them as valuable advisors who know every detail of our devices and understand the unique nuances of your processes.

What is Lifecycle Agreement

Lifecycle Agreement is an integrated package of solution services that optimizes maintenance by tailoring it to the customer's equipment lifecycle. This program meets diverse needs by creating a lifecycle plan for each customer's system, and based on which you can select and combine the most suitable services from a variety of options.

Make a Need-Oriented Decision

Experts from the nearest Regional Service Center can provide a full appraisal of your facility and help you make an informed decision for the service you truly need.

Your plant is unlike any other, yet all plants require regular service to maintain ongoing safety and productivity. SUPCON offers a range of flexible service contracts that allow us to proactively deliver the service your operations require. We'll help you preempt the hassle and expense of unexpected breakdowns and potential inefficiencies. Depending on your needs, SUPCON's scheduled service and maintenance contracts may cover routine repairs, period upgrades, recalibration and wireless network diagnostics and services.

Tailor Service Packages for Your Plants

SUPCON defines several service packages that cover all the right elements to tailor a program for your specific support needs by addressing your specific availability, performance improvement, and sustainability requirements.

Our main service packages include:

- Training
- Repair service
- On-site service
- Spares management
- Project start-up support
- Security assessment service
- Backup and recovery service
- Sysetem upgrade/migration service
- Control performance improvement & modernization consulting studies

Process improvement and optimization solution

Production Excellence

Minimized dow-time and enhanced asset protection

Asset Excellence

Comprehensive solution for cyber security

Safety Excellence

LIFECYCLE SERVICE